

TWO NEW SPECIES OF WATER-STRIDERS OF THE GENUS *OIOVELIA*  
FROM THE TEPUI CERRO DE LA NEBLINA,  
VENEZUELA (HEMIPTERA: VELIIDAE)

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*Abstract.*—Two new species of veliid water-striders, *Oiovelia spumicola* and *Oiovelia rivicola*, from Venezuela are described; distinctive characters are illustrated with pen and ink line drawings and SEM micrographs. For *O. spumicola* the unusual color and the unusual habitat in piles of foam on tropical blackwater streams are discussed. A key to identify the three species now known in the genus *Oiovelia* is included. New and additional illustrations and new distribution records for the type species of the genus, *O. cunucunumana* Drake and Maldonado Capriles, are provided.

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The genus *Oiovelia* and the one included species *O. cunucunumana*, based on three female specimens from Venezuela, were described by Drake and Maldonado Capriles (1952); later, a winged male from Paraguay was described as the "allo-type" by Drake and Roze (1955). The genus was not reported again until Andersen (1982) included it in his key to the genera of the Veliinae.

The two new species described below were collected during an expedition to Cerro de la Neblina, the "Mountain of the Mists," in the Territorio Federal de Amazonas, Venezuela, at the Brazilian border. Cerro de la Neblina is one of the numerous mesas (tepui)s which are eroded sandstone remains of the Guiana Highland Shield, a former large plateau which probably dates back to the time when South America and Africa formed a single huge continent. The tepuis are home to numerous endemic genera of plants and some animals. Although the genus *Oiovelia* occurs on Cerro de la Neblina, it is not restricted to the tepuis because I have seen specimens of *O. cunucunumana* from Venezuela, Brazil, Paraguay and Peru in the entomological collections of the National Museum of Natural History, Smithsonian Institution.

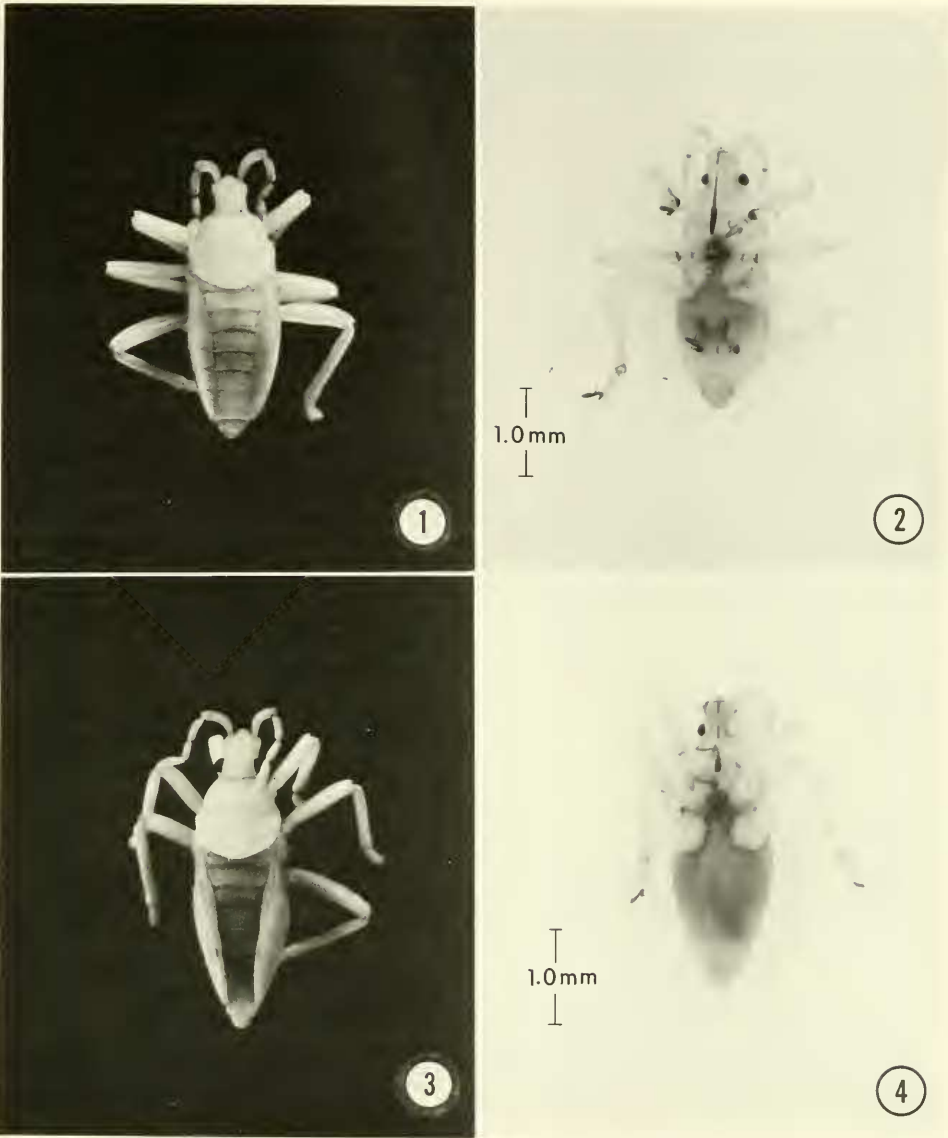
The new species *O. spumicola* is interesting because it is the only veliid known that lives on and in piles of foam on blackwater streams. All nymphs and apterous adults collected are creamy white; therefore, the specimens matched the color of the foam and were difficult to see. The few winged adults were grey and more obvious on the white foam. However, if the winged forms disperse the species by flying to new habitats, their darker color over the blackwater streams and the forest floor would make them less obvious to predators.

*Oiovelia spumicola*, NEW SPECIES

Figs. 1-12, 21

Apterous holotype male.—*Size:* Length, 3.01 mm; greatest width, 0.97 mm.

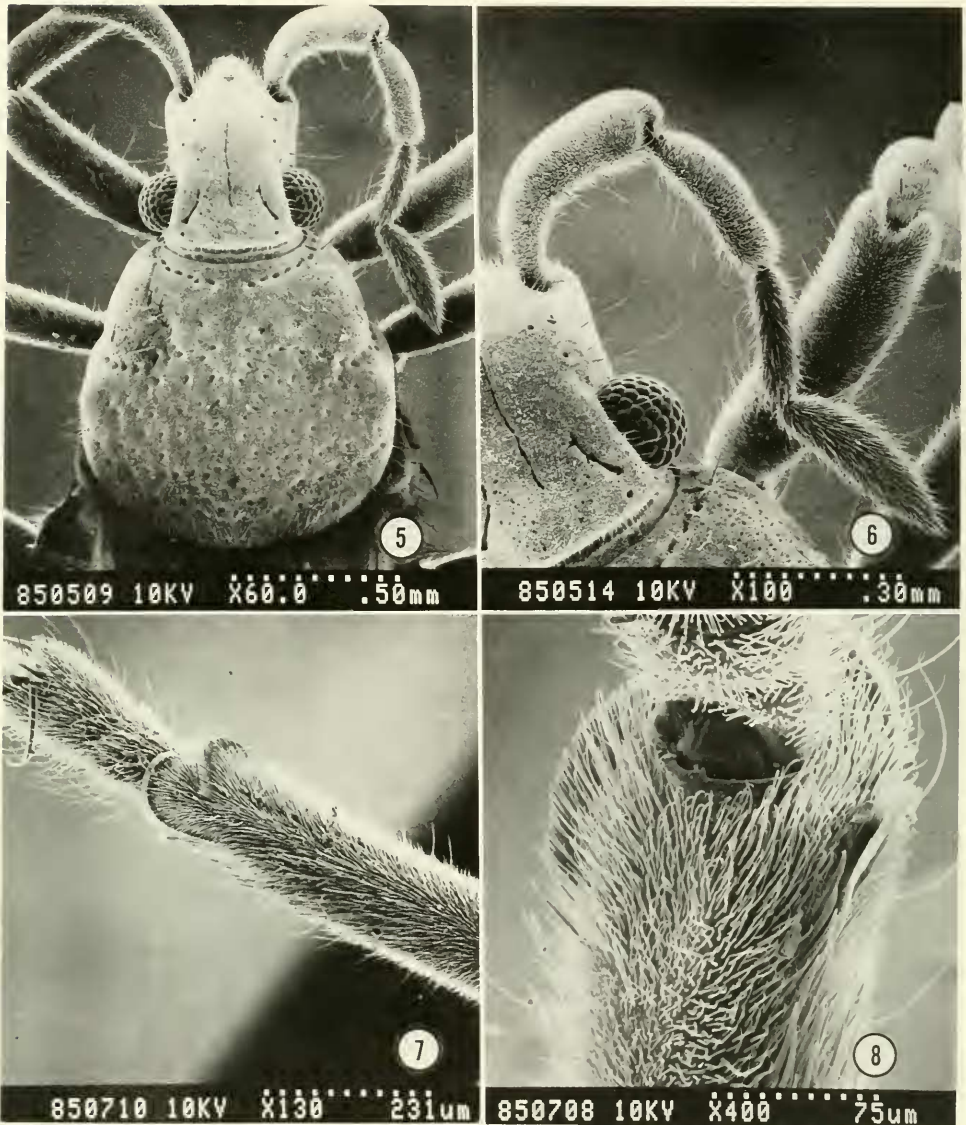
*Color:* Creamy white except (Figs. 1-4); eyes reddish brown; apical third of



Figs. 1-4. *Oiovelia spunicola*, new species. 1, Male, dorsal view. 2, Male, ventral view. 3, Female, dorsal view. 4, Female, ventral view.

rostrum dark brown; antennal segments 1 and 2 brownish yellow, last segment creamy yellow; apicomedial edge of protibiae, apices of last tarsal segments, and tarsal claws brownish yellow; mid-metasternum black. With a rather broad medial, V-shaped, dark reddish-brown structure visible through the cuticle of sterna 4 and 5 (Fig. 2).

*Head:* Width between eyes, 0.35 mm. Cuticle finely pubescent; with few long, slender, light yellowish-brown setae above and in front of eyes (Fig. 5). Rostrum extending to mesocoxae. Antennae (Fig. 6) with fine, dense, yellowish pubescence and a few longer, darker setae interspersed; segment 1 arcuate, distinctly swollen apically, distinctly thicker than and twice as long as segment 2; segment 2 more

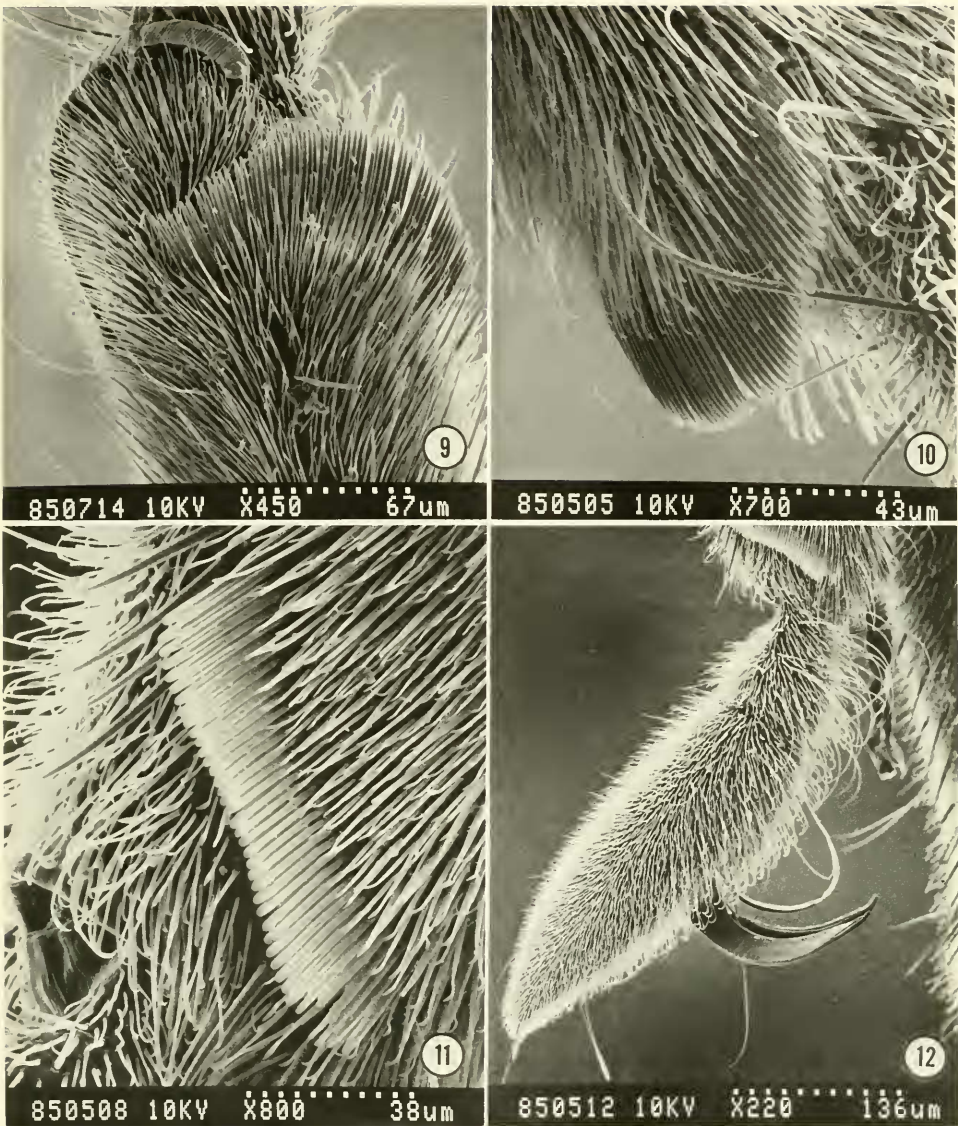


Figs. 5–8. *Oiovelia spumicola*, new species. 5, Head and pronotum, dorsal view. 6, Antenna. 7, Protibial apex. 8, Protibial apex enlarged, ventral view.

slender and slightly longer than segment 3; segment 4 swollen and about a fourth longer than segment 3.

*Thorax*: Pronotum (Fig. 5) narrowest apically; sides diverging and rounded from shallow constriction at anterior third; midline impunctate; posterior three-fourths coarsely, sparsely punctate; a few coarse punctures laterad of procoxae. Protibia (Figs. 7–11) with a long transverse grooming comb, a short transverse grooming comb, and a distal short arcuate grasping comb.

*Abdomen*: Cuticle with fine, dense, short, yellowish pubescence. Laterotergites strongly reflexed above abdominal terga. Last segment with ovate genital capsule twice as long as seventh segment on midline.



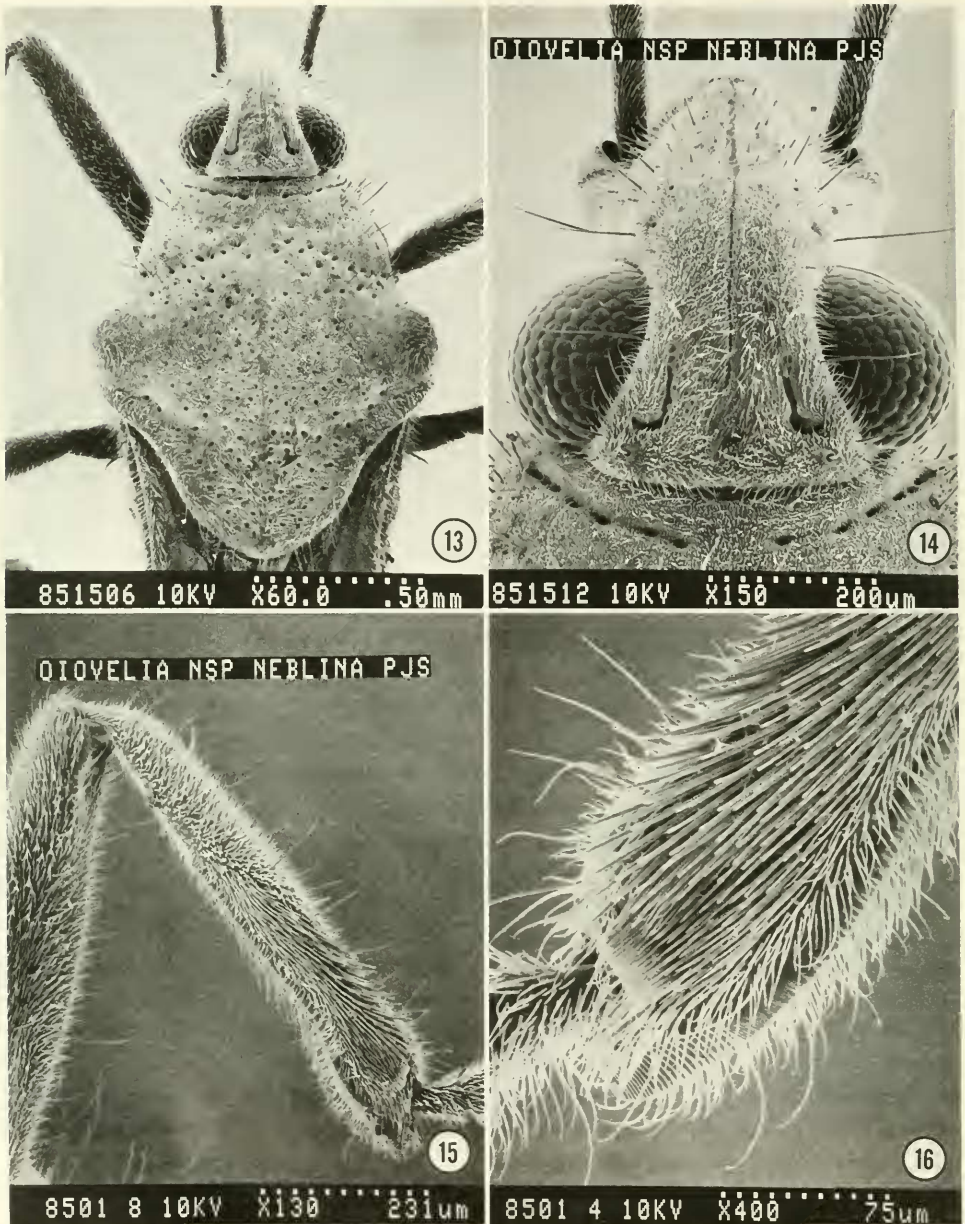
Figs. 9–12. *Oiovelia spumicola*, new species. 9, Protibial apex with grasping comb and long grooming comb. 10, Long grooming comb. 11, Short grooming comb. 12, Tarsal claws.

*Male genitalia:* Proctiger convex; with a single toothlike process on dorsal surface. Clasper narrow at base, widest slightly before midlength; tapered distally and ending as a small, acute, apical hook as illustrated (Fig. 21).

Apterous allotype.—Length, 3.24 mm; greatest width, 0.97 mm. Female genital capsule about as long as seventh segment on midline. Otherwise, similar in appearance to the holotype male.

Winged males.—*Size:* Length, 3.24 to 3.44 mm; greatest width, 1.35 to 1.39 mm.

*Color:* Dorsum of head, antennal segments 1–3, sides of thorax, and sides of abdominal sterna dark brown. Abdominal sterna 4 and 5 with a rather broad, medial, V-shaped, dark reddish-brown structure showing through cuticle. Prono-

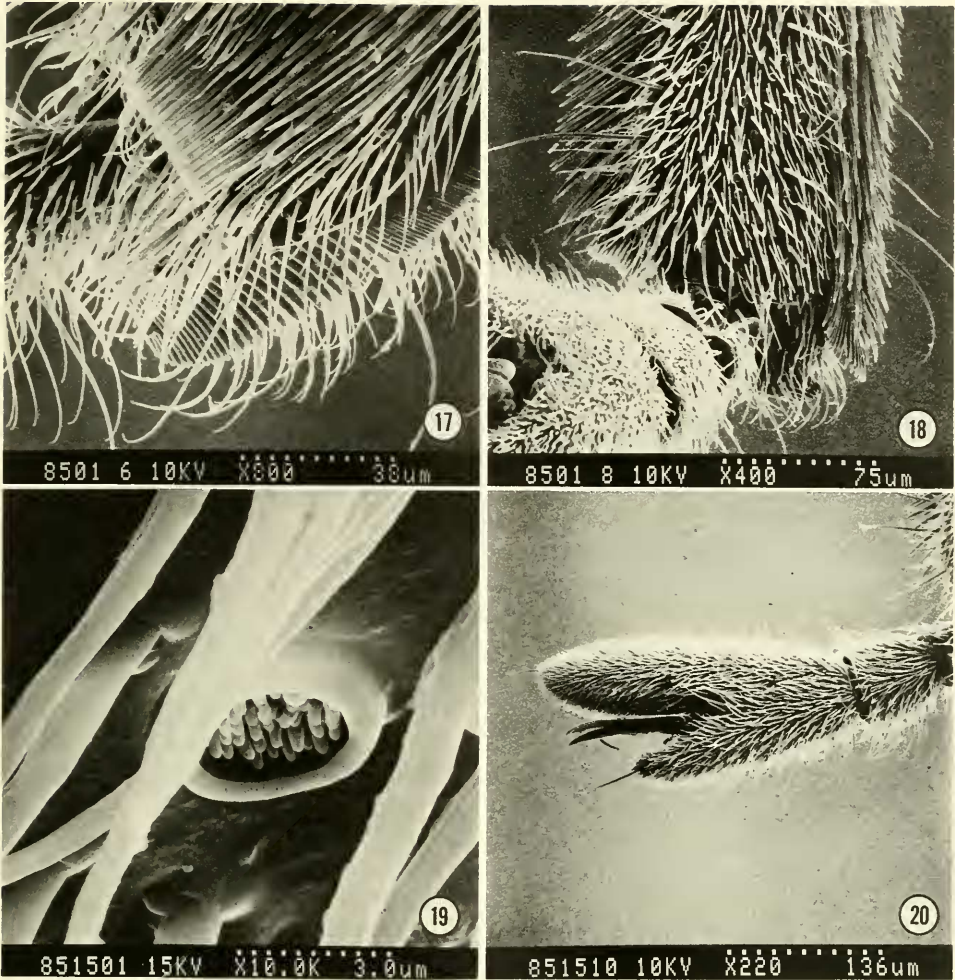


Figs. 13–16. *Oiovelia rivicola*, new species. 13, Head and pronotum. 14, Head. 15, Protibia. 16, Protibial apex.

tum with anterior third reddish brown and posterior two-thirds creamy yellow. Legs creamy yellow except apices of femora, bases of protibiae, mesotibiae, and metatibiae and tarsal segments dark brown. Forewing dark brown except Sc + R creamy yellow.

*Head*: Similar to apterous form except median longitudinal groove on head more distinct.

*Thorax*: Similar to apterous form except pronotum diverging strongly to mid-



Figs. 17–20. *Oiovelia rivicola*, new species. 17, Protibial apex. 18, Protibial apex showing peg-plates. 19, Peg-plate enlarged. 20, Last segment of tarsus.

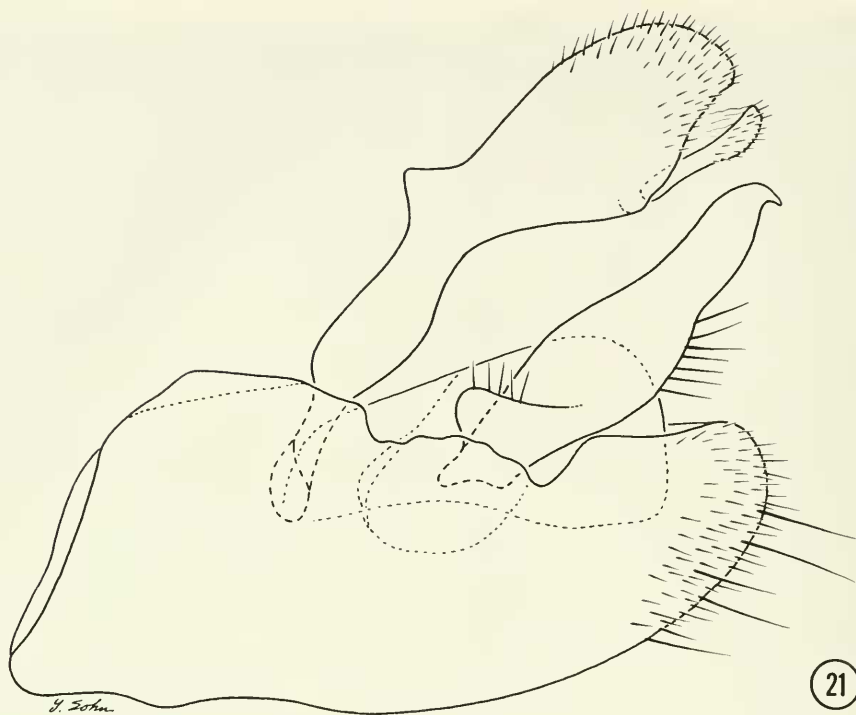
length then becoming strongly angular before converging to rounded base; surface with an occasional long, dark brown seta. Forewing with veins and 4 cells present but obscured by dark brown coloration.

**Abdomen:** Similar to apterous form but pubescence not as distinctly yellow because of dark cuticular coloration. Genital capsule twice as long as seventh segment on midline as in apterous male.

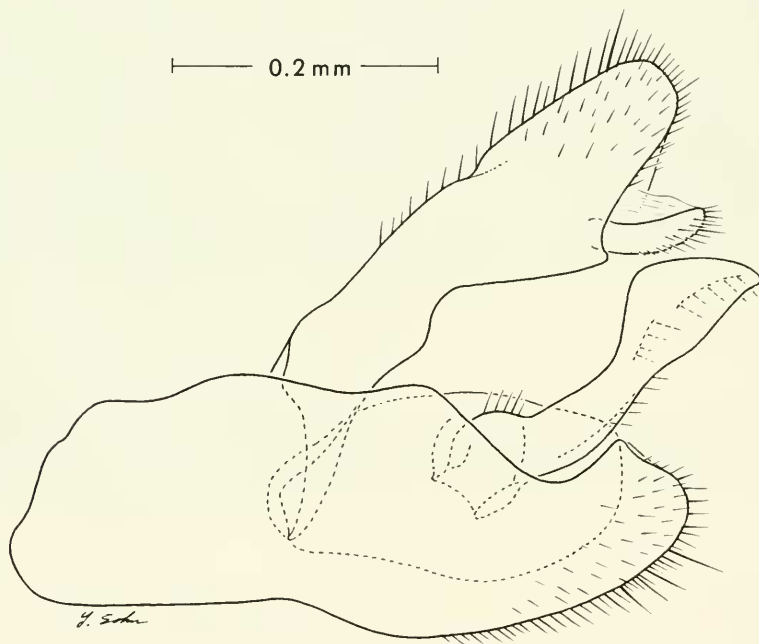
**Winged females.**—Length, 3.74 to 3.78 mm; greatest width, 1.43 to 1.50 mm. Similar to winged male except genital capsule about as long as seventh segment on midline.

**Eggs.**—Most of the females were gravid and the eggs are visible through the distended body wall. One female was dissected and three elongate eggs were found packed tightly in the abdomen. The eggs average 0.99 mm in length and 0.42 mm across the diameter; the chorion appears smooth.

**Variations.**—The only variations noted were in the intensity of the brownish



0.2 mm



Figs. 21, 22. 21, *Oiovelia spumicola*, new species; male genitalia, lateral view. 22, *Oiovelia rivicola*, new species; male genitalia, lateral view.

yellow present on the apterous specimens. The winged forms also vary in intensity of coloration; one specimen has the abdominal sterna creamy yellow instead of dark grey as in the other specimens. Males may be distinguished from females by a broad, dark, almost black, V-shaped structure visible through the cuticle on the middle of the fourth and fifth abdominal sterna (more easily seen when specimens are in alcohol). In a few specimens this structure is very light but the lateral margins are visible.

Comparative notes.—The wingless specimens of *O. spumicola* differ from specimens of *O. rivicola*, n. sp., and *O. cunucunumana* Drake and Maldonado Capriles (1952) by the creamy yellow integument. The winged form of *O. spumicola* may be distinguished immediately from specimens of *O. rivicola* and *O. cunucunumana* by the creamy yellow legs. Male genitalia of *O. spumicola* have less sinuate claspers with few (6 or 7) long setae on the middle third posteriorly; the apex is acute and slightly hooklike; also, the proctiger has a single moderately broad dentiform process dorsally at midlength (Fig. 21). In contrast, males of *O. rivicola* have the claspers narrowed at the base and diverging to a broad apex (Fig. 22); the proctiger lacks toothlike processes on the dorsal surface. Males of *O. cunucunumana* have sinuate claspers with short setae on the posterior margin except at the basal fourth; the apex is bluntly rounded (Fig. 25); and the proctiger lacks a dorsal, dentiform process at midlength (Fig. 25).

Type-date.—Apterous holotype male: VENEZUELA, Territorio Federal Amazonas, Cerro de la Neblina, Camp XI, 00°52'N, 65°58'W, 27–28 February 1985, 1450 m, P.J. and P.M. Spangler, R.A. Faitoute; deposited in the National Museum of Natural History, Smithsonian Institution. Apterous allotype, same data as holotype. Paratypes: Same data as holotype, 33 apterous and 3 winged males; 40 apterous and 2 winged females. In addition, 52 nymphs were collected with the type specimens but are not designated as paratypes. Paratypes will be deposited in the collections of: The Instituto de Zoología Agrícola, Facultad de Agronomía, Maracay, Venezuela; the British Museum (Natural History), London, England; The Snow Entomological Museum, University of Kansas, Lawrence, Kansas; the Zoological Museum, University of Copenhagen, Copenhagen, Denmark; Laboratorium voor Zoologische, Oecologie en Taxonomie, Utrecht, Netherlands; and the collection of John T. Polhemus, Englewood, Colorado.

Etymology.—The specific epithet *spumicola* was formed by combining the following. *L. spuma*, meaning “foam”; with *L. cola*, meaning “dweller in”; in reference to the curious habitat in which this species was found.

Habitat.—The creamy white specimens described above were first noticed as they were feeding on a dead, adult black stonefly which was floating in a pile of foam in an eddy of a small stream. When the stonefly was collected, the veliids scurried over the surface and into the foam. Further observations on this curious behavior led to the conclusion that piles of foam apparently are their normal habitat. Undisturbed specimens would wander in and out of the foam presumably searching for other organisms trapped in it.

Most specimens were collected by dipping up piles of foam in a net and rinsing the foam through the mesh; this left the veliids in the net. A few specimens were aspirated from the surface of the foam and a few were found in leaf packs against which the foam had drifted. Their creamy white color blended closely with the



foam but contrasted sharply against the dark green and brown leaves in the leaf packs which suggests that the light color is a protective adaptation for these foam-inhabiting veliids. All the nymphs and apterous adults are creamy white and only the five winged adults are darker as described above but they are lighter colored than most veliids.

*Oiovelia rivicola* NEW SPECIES

Figs. 13–20, 22

Macropterous holotype male.—*Size*: Length, 3.16 mm.; greatest width, 1.04 mm.

*Color*: Head reddish brown; eyes black and shiny; antennae dark reddish brown. Pronotum reddish brown as head and a broadly V-shaped somewhat silvery macula on basal fourth. Apical third and ventral surface of rostrum (in repose), dark brown; other parts brownish yellow. Legs dark reddish brown except coxae and trochanters brownish yellow. Venter dark reddish brown; with small, indistinct, longitudinal, band-like maculae on dorsolateral margins of metasternum; band-like maculae on dorsolateral margins of all abdominal sterna.

*Head*: Width between eyes, 0.23 mm. Cuticle with fine pubescence (Figs. 13, 14); with numerous long, slender, dark reddish-brown setae in front of eyes and a few between eyes. Rostrum extending to mesocoxae. Antennae with fine, dense, reddish-brown pubescence; a few longer, darker setae interspersed on last two segments; segment 1 arcuate, gradually swelling toward apex, slightly thicker and slightly longer than segment 2; segment 2 more slender and slightly longer than segment 3; segment 4 swollen and slightly longer than segment 3.

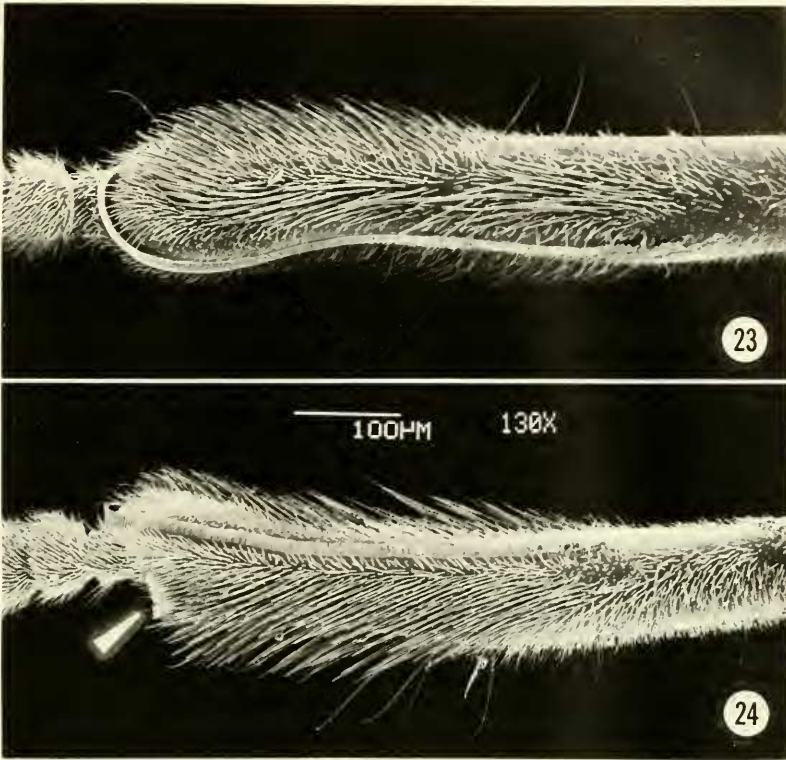
*Thorax*: Pronotum (Fig. 13) narrowest apically; sides diverging and gibbous behind shallow constriction at anterior third; disk coarsely, sparsely punctate except on midline, punctures more obvious in constricted area; with an oblique row of coarse, distinct punctures laterad of procoxae. Protibia (Figs. 15–18) with long, grasping comb (Fig. 15) extending about two-thirds length of tibia and a grooming comb distally (Figs. 16, 17, arrow); lower surface (Figs. 18, 19) with peg-plates. Last segment of protarsus typically expanded (Fig. 20). Forewing as long as abdomen; with short, narrow, longitudinal, white macula at base beside pronotal lobe.

*Abdomen*: Cuticle with fine, dense, short, yellowish pubescence. Laterotergites strongly reflexed above abdominal terga. Last segment with ovate genital capsule a third longer than seventh segment on midline.

*Male genitalia*: Proctiger convex without toothlike processes on dorsal surface. Clasper narrow at base and diverging to broad apex as illustrated (Fig. 22).

Macropterous allotype.—Similar to male except: Length, 3.40 mm.; greatest width, 1.20 mm. Coarse pronotal punctures dense and more obvious than those on male. Forewings as on male. Female genital capsule about a fifth longer than seventh abdominal segment on midline.

Variation.—This new species varies in the intensity of the silvery maculae on the pronotum. When wet, the maculae are indistinct but become more obvious as the cuticle dries. On some specimens a partial, longitudinal silvery stripe is present on the midline. Also, on some specimens the abdomen is yellowish brown with a narrow, black, band-like area above the lateral, shiny, elongate, cuticular depressions; in other specimens the abdomen is almost entirely black which ob-

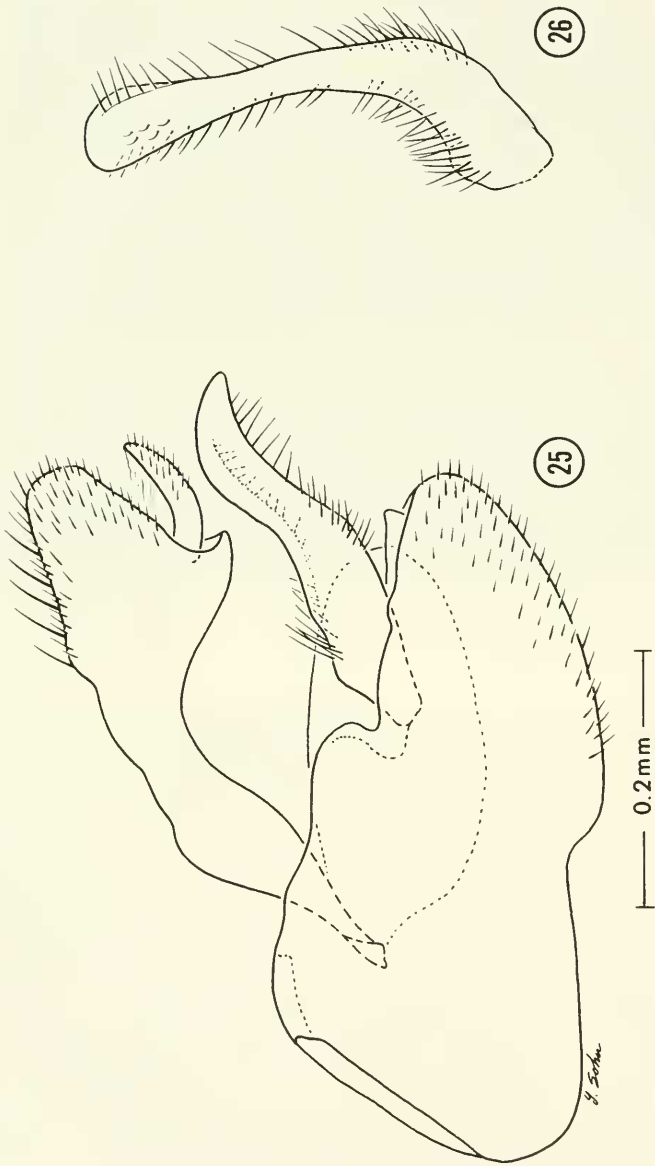


Figs. 23, 24. *Oiovelia cunucunumana* Drake and Maldonado Capriles. 23, Protarsal grasping comb. 24, Protarsal grasping comb and grooming comb (arrow).

scures the band-like area. Females are more robust and are longer (3.66–3.89 mm) than the slender and shorter males (3.16–3.32 mm).

Comparative notes.—The new species *O. rivicola* most closely resembles *O. cunucunumana* Drake and Maldonado Capriles (1952) but may be distinguished from that species by the following combination of characters: 1, apical segment of antenna only slightly broader than preapical segment instead of a third broader; 2, body more slender and shorter (length, 3.16 vs. 4.4 mm); 3, narrow black band-like maculae on dorsolateral margin of metasternum and abdominal sterna above the shiny, elongate, cuticular depressions; 4, in males, the clasper strongly broadened preapically (Fig. 22) instead of simply sinuous (Fig. 25).

Type-data.—Macropterous Holotype Male: VENEZUELA, Territorio Federal Amazonas, Cerro de la Neblina, base camp, 140 m, 0°50'N, 66°10'W, 21 February 1985, P. J. & P. M. Spangler, R. A. Faitoute, & W. E. Steiner; deposited in the National Museum of Natural History, Smithsonian Institution. Macropterous allotype, same data as holotype. Paratypes: Same data as holotype, 15 males, 9 females; same data except 24 February 1985, 7 males, 4 females. Paratypes will be deposited in the Universidad Central de Venezuela, the British Museum (Natural History), the University of Kansas, and the collection of John T. Polhemus, Englewood, Colorado.



Figs. 25, 26. *Oiovelia cumucumumana* Drake and Maldonado Capriles. 25, Male genitalia, lateral view, with clasper in situ. 26, Clasper detached from capsule.

Etymology.—The specific epithet *rivicola* was formed by combining the following. *L. rivus*, meaning “stream or brook”; with *L. cola*, meaning “dweller in”; in reference to the presumed habitat of this species.

Habitat.—All specimens were attracted to and collected at an ultraviolet light operated at base camp near the Rio Baria.

***Oiovelia cunucunumana* Drake and Maldonado Capriles**

Figs. 23–26

*Oiovelia cunucunumana* Drake and Maldonado Capriles, 1952:52.—Drake and Roze, 1955:107.

This was the only species described for their new genus *Oiovelia*. The description was based on a winged female holotype and two winged female paratypes. Later, when both sexes became available from Paraguay, Drake and Roze (1955) described a winged male as the allotype.

The length of *O. cunucunumana* was not given for the holotype nor allotype in the articles cited above; the length for each is: holotype, 3.86 mm; allotype, 3.39 mm.

The grasping comb (Figs. 23, 24) on the male protarsus mentioned by Drake and Roze (1955) and the short, transverse, grooming comb (Fig. 24, arrow) are illustrated here from the male from Nova Teutonia, Brazil. The genitalia of the male allotype from Paraguay were dissected, cleared, and are illustrated (Fig. 25). Because the clasper is different in shape when drawn laterally in situ (Fig. 25) than when detached, it is drawn separately to illustrate the difference (Fig. 26).

Type specimens, examined.—Holotype: VENEZUELA: Territorio Amazonas, mouth Cunucunuman R., 3 April 1950, J. Maldonado Capriles, 1 winged female. Allotype: PARAGUAY: Paraguay R., 25 Nov. 1951, 1 male. Paratype: VENEZUELA: Territorio Amazonas, Culebra, N. Duida, 1–4 July 1950, J. Maldonado Capriles, 1 female. The specimens cited above are in the collections of the U.S. National Museum of Natural History (NMNH), Smithsonian Institution. However, a second female paratype reported by Drake and Maldonado Capriles (1952) from the same locality as the holotype and another specimen reported by Drake and Roze (1955) from “a small stream near Caracas, Venezuela” are not among the specimens in the NMNH.

Additional specimens examined (NMNH).—BRAZIL: Nova Teutonia, 8 July 1963, F. Plaumann, 1; Santa Catarina, 5 Feb. 1950, F. Plaumann, 1 male, 1 female. PARAGUAY: Paraguay R., 25 Nov. 1951, 6 females; same locality, 28 Nov. 1951, 1 female. PERU: Iquitos, Amazon River, 12 Oct. 1955, S. S. Roback, 1 female. The specimens from Paraguay and Venezuela were identified by C. J. Drake; the single female from Peru was identified by J. C. Lutz.

KEY TO SPECIES OF *OIOVELIA*

1. Pronotum entirely creamy yellow (wingless forms) or only on posterior half (winged forms); with only a few additional long brownish setae on anterior fourth. Antennae densely tomentose (Fig. 6), brownish yellow except last segment creamy yellow (wingless forms). Femora creamy yellow except narrowly brownish yellow apically. Clasper of male genitalia ta-

- pered distally, ending in acute, apical hook (Fig. 21) .....  
 ..... *spumicola*, new species
- Pronotum reddish brown; with numerous, long, dark brown setae; setae abundant on anterior third and along margins but sparse on discal area. Antennae not densely tomentose (Figs. 13, 14). Femora reddish brown. Clasper of male genitalia not hooked (Figs. 22, 25) ..... 2
2. Ratio of antennal segments 31:27:19:22. Total length, 3.16–3.89 mm. Clasper of male genitalia broadened preapically (Fig. 22) .....  
 ..... *rivicola*, new species
- Ratio of antennal segments 30:22:15:19. Total length, 3.39–3.97 mm. Clasper of male genitalia not broadened apically when viewed in situ (Fig. 25) but broadened when seen detached (Fig. 26) .....  
 ..... *cunucunumana* Drake and Maldonado Capriles

#### ACKNOWLEDGMENTS

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In addition, I thank the following people for their assistance: Phyllis M. Spangler, Robin A. Faitoute, and Warren E. Steiner for assistance with collecting and preparing the specimens of these new species for study; Dr. R. C. Froeschner for helpful discussions and suggestions; Young T. Sohn, biological illustrator, for the pen and ink drawings; the administrators of the Smithsonian Institution's Scholarly Research Fund for supporting the fieldwork during which these new veliids were collected; and Phyllis Spangler for typing the manuscript into the word processor.

#### LITERATURE CITED

- Andersen, N. M. 1982. The semiaquatic bugs (Hemiptera, Gerromorpha), phylogeny, adaptations, biogeography, and classification. *Entomonograph* 3: 1–455.
- Drake, C. J. and J. Maldonado Capriles. 1952. Water-striders from Territorio Amazonas of Venezuela (Hemiptera: Hydrometridae, Veliidae). *Great Basin Naturalist* 12: 47–54.
- Drake, C. J. and Janis A. Roze. 1955. A new species of *Veloidea* from Venezuela (Hemiptera: Veliidae). *Bulletin of the Brooklyn Entomological Society* 50: 106–109.